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INTELLECTUAL PROPERTY  
INDIA



सत्यमेव जयते

## GOVERNMENT OF INDIA

### PATENT OFFICE

Ministry of Commerce and Industry  
Department of Industrial Policy and Promotion

It is hereby certified that annexed here to is a true copy of **Application, Provisional Specification & Abstract** of the patent application as filed and detailed below:-

Date of application : 15-02-2004

Application No : 1012/CHE/2003

Applicants : M/s. Matrixview Pte Ltd, 9, Shenton Way #05-02,  
Singapore 068813.

In witness there of  
I have here unto set my hand

Dated this the 01st day of April 2005  
11th day of Chaitra, 1926(Saka)

By Authority of  
THE CONTROLLER GENERAL OF PATENTS,  
DESIGNS AND TRADE MARKS.

(M.S.VENKATARAMAN)  
ASSISTANT CONTROLLER OF PATENTS & DESIGNS

PATENT OFFICE BRANCH  
Guna Complex, 6<sup>th</sup> Floor, Annex.II  
No.443, Anna Salai, Teynampet,  
Chennai – 600 018. India.

Rs 3000/-  
1012/CHE/2003  
15/XII

**FORM 1**

The Patents Act 1970  
(39 of 1970)

1012/CHE/2003

10 12 2003

**APPLICATION FOR GRANT OF A PATENT**  
(See sec.5 (2), 7, 54 and 135 and Rule 33A)

CBR: 7135  
1012/CHE/03

Matrixview Pte Ltd  
9 Shenton Way #05-02  
Singapore 068813  
Tel: (65) 6336 2777

1. Hereby declare -
- (a) That we are in possession of an invention titled  
**"UNIQUE METHOD OF DATA ENCRYPTION BY REPETITION  
CODED COMPRESSION"**
  - (b) That the Provisional Specification relating to this invention is filed  
with this application.
  - (c) That there is no lawful ground of objection to the grant of a patent to  
us.

2. Further declare that the inventor for the said invention is,

**Arvind Thiagarajan**  
H 24/6, Vaigai Street, Besant Nagar  
Chennai 600090. Nationality - Indian

3. We, claim the priority from the application(s) filed in convention countries,  
particulars of which are as follows:-

Not applicable

4. We state that the said invention is an improvement in or modification of the  
invention, the particulars of which are as follows and of which we are the  
applicant/patentee:

Not applicable

5. We state that the application is divided out of our application, the particulars  
of which are given below and pray that is application deemed to have been  
filed on \_\_\_\_\_ under section 16 of the act.

Not applicable

Post-dated 15 FEB 2004

15 DEC 2003

1012/CHE/2003

6. That we are the assignee of the true and first inventor.

Not applicable

7. That our address for service in India is as follows:

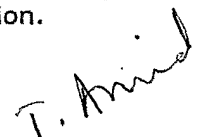
**Matrix View Technologies (India) Private Limited**

No.69, Mahalakshmi Koil Sreet  
Kalakshetra Colony, Besant Nagar  
Chennai 600090. TAMILNADU. INDIA.

8. Following declaration was given by the inventor or applicant in the convention country declare that the applicant herein is our assignee or legal representative

Not applicable

9. That to the best of my knowledge, information and belief the facts and matters stated herein the correct and that there is no lawful ground of objection to the grant of patent to us on this application.

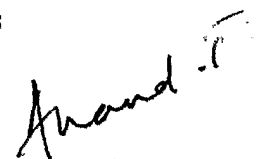
  
Mr. Arvind Thiagarajan  
(Inventor)

10. Following are the attachment with the application:

- a) Provisional specification (3 copies)
- b) Fee of Rs.

I request that a patent may be granted to us for the said invention

Dated at Chennai on this 11<sup>th</sup> day of December, 2003

  
Mr. Anand Thyagarajan  
(Authorized Signatory)

To

The Controller of Patents  
The Patent Office  
At Chennai

FORM 2

The Patents Act, 1970

**Provisional Specification**

Section 10

**"UNIQUE METHOD OF DATA ENCRYPTION BY  
REPETITION CODED COMPRESSION"**

Applicant:

**ARVIND THIAGARAJAN  
H 24/6, Vaigai Street  
Besant Nagar, Chennai 600090  
TAMILNADU. INDIA.**

The following Provisional Specification describes the nature of the invention and the manner in which it is to be performed.

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### **Field of Invention**

The present invention relates to the Encryption of the image or other correlated data streams by Repetitive Coded Compression Process.

### **Background of Invention**

The role of data and image compression assumes significant importance as the world makes a paradigm shift from analog to digital systems. Data compression, which was impossible due to the inherent disadvantages of the analog systems, has become a feasible reality with digital systems. The computational overheads and the complexity posed the most serious threat to the development data compression. With the advent of high-speed digital processors with MIPS capability most of these problems have been overcome.

Image compression can be either lossy or lossless depending on the criticality and nature of the application. The human eye is more sensitive to changes in luminance than to changes in color. Hence for applications that are not critical in nature i.e. in cases where the quality of the compressed data is not an important factor for further processing lossy compression can be employed. The portions of the image data that do not produce a perceptible visual difference are removed resulting in excellent compression ratios. There are applications where image distortion is totally unacceptable, which require only lossless compression, where portions of image cannot be removed no matter how inconsequential the data is, resulting in very low compression ratios. An ideal solution to this problem will be a

lossless compression technique that produces significant compression ratios, which is exactly the motivation behind Repetition Coded Compression RCC.

Image compression has many practical applications, which are driven by the fact that image data is a highly correlated data stream. With the advent of networking and remote access, there is a strong need for security and privacy.

Security plays a significant role in Image compression. Applications like video on demand, pay per view and medical image management today require data protection in addition to the compression. Consider a medical imaging application, where modern healthcare standards like HL – 7 and DICOM make it compulsory to store the patient details for up to 5 years, in this case we would not only need to make sure that compressed images are stored to save storage space but also make sure that transmission of these images is made absolutely secure to maintain the sacrosanct nature of patient details.

Encryption is a secure and trusted method for keeping highly sensitive information private. It is a reversible process by which bits of data are mathematically scrambled with a password-key. Encryption transforms the data so that it is unreadable until it is decrypted.

### **Data Encryption**

Some of the encryption techniques include. Digital watermarking, RSA, PGP, DES. In Watermarking encryption, by doing minor modification of the original data, a watermark is embedded in the host data. PGP (pretty good privacy), is an open

source encryption that generates a pair of keys public key and a private key. This method would require additional transmission of public keys along with the encrypted data, which would add to the data overhead. These encryption techniques involve complex algorithms and that it would put an additional overhead on the hardware. Also some encryption techniques involve passwords that maybe predictable and thus do not offer strong security.

Encryption, involves authentication and aims to identify images or documents wherever they travel in the network. This involves retaining small packages of information in secure form, during transmission or remote access.

### **Principle and Description**

In RCC, data compression is related closely to data encryption. The objective of compression is to reduce the data volume and achieve reproduction of the original data without any perceived loss in data quality. And the objective of encryption is to transform data into an unreadable form to ensure privacy. But the main drawback of this process is that most commonly available data compression techniques are open standards like (JPEG etc) wherein any implementation of the algorithm has to be compatible with the others thereby revealing the decryption process to becomes known to everyone. Also the open standards are non-encrypted and a layer of encryption should be added, and the opposite is done for decryption.

Some information is too valuable to be lost in transmission and it is very important to secure highly correlated data and images. RCC offers an inbuilt mathematical manipulation similar to data compression, unlike the JPEG algorithm



that uses an additional open source encryption technique. Both the forward and reverse compression processes of RCC are known only to the developers of the algorithm, ensuring privacy allowing secure communication of compressed data.

### **Disadvantages of Current Algorithms**

Currently existing open image compression standards don't have an in built compression capability and their standards are defined in a way such that there is no provision to add an encryption layer. Hence once the compressed files are encrypted with a suitable encryption algorithm they no longer conform to the open standard hence the purpose of having an open standard is lost

### **Advantages of RCC**

RCC does not utilize complex modeling and coding models. RCC uses simple, logical transformations and mathematical operations that make the whole algorithm much simpler when compared to JPEG families and other wavelet transforms. The RCC encryption has been developed to be used without any additional network equipment or application software.

The encryption process certainly offsets any losses due to process overheads, as it does not require extra time or bits. This makes compression, encryption and decompression on the fly without any loss of time. The RCC Encryption System encrypts without reformatting or converting the image, text or data. The inbuilt proprietary algorithm leads to techniques that can simultaneously provide security functions and an overall visual check.

The RCC algorithm provides inherent encryption for a secure and lossless transmission.

### **Applications of the Present Invention**

Repetition Coded Compression can be used in a wide gamut of applications ranging from Medical Imaging to Digital Entertainment to Document management. Each of these verticals requires Repetition Coded Compression to be implemented in its own unique way to deliver a robust and powerful end product.

Repetition Coded Compression could be deployed in the following forms for commercialization.

1. Chip – (ASIC, FPGA etc.)
2. DSP, Embedded Systems
3. Standalone Hardware boxes
4. Licensable Software (as DLL's OCX etc.)
5. Software deliverables

Thus, the above mentioned account describes the invention in detail. It is intended that the foregoing description is only illustrative of the present invention and it is not intended that this unique invention be limited or restricted thereto.

Many specific embodiments of this novel invention will be apparent to one, skilled in the art from the foregoing disclosure. The scope of the invention should be determined not only with reference to the above description but to all other

additions, substitutions & modification of the present invention without departing from the spirit of this invention.

## **ABSTRACT**

RCC warrants a secure transmission of highly correlated data and images with simple, on the fly, encryption and decryption. The encryption process certainly offsets any losses due to process overheads, as it does not require extra time or bits. Both the forward and reverse compression processes of RCC are known only to the developers of the algorithm, ensuring privacy allowing secure communication of compressed data. RCC does not utilize complex modeling and coding models. RCC uses simple, logical transformations and mathematical operations that make the whole algorithm much simpler when compared to JPEG families and other wavelet transforms. This makes compression, encryption and decompression on the fly, without any loss of time and increase of storage space.